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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,960	07/03/2003	Olgica Bakajin	IL-11046	6753

7590 04/14/2005

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EXAMINER

MENON, KRISHNAN S

ART UNIT PAPER NUMBER

1723

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,960

Applicant(s)

BAKAJIN ET AL.

Examiner

Krishnan S. Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 20-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 45 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claims 1-46 are pending as of the original filing.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-19 and 45-46, drawn to microfluidic sieve and method of use, classified in class 210, subclass 503.
- II. Claims 20-44, drawn to method of fabricating microfluidic sieve, classified in class 427, subclass 249.2.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process as claimed can be used for making other materially different products such as biosensors.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

During a telephone conversation with James Tak on 4/8/05 a provisional election was made without traverse to prosecute the invention of group I, claims 1-19 and 45-46. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-44 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-17, 45 and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Noca et al (US 6,685,810).

Claims 1 and 2: Noca teaches a microfluidic sieve comprising a substrate with a channel and plurality of carbon nanotubes fixedly attached within the channel (fig 5 and

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6). The limitation 'for separating,...' etc., is intended use. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). The limitation 'intertwined' or 'extend randomly' is taught by the reference at col 3 lines 53-56 as disordered with uncontrolled spacing, and as less desirable, and the ordered and uniform pattern as more desirable. A reference is no less anticipatory if, after disclosing the invention, the reference then disparages it. The question whether a reference "teaches away" from the invention is inapplicable to an anticipation analysis. *Celeritas Technologies Ltd. v. Rockwell International Corp.*, 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir. 1998)

Claim 3: channel filled with the mesh – see figure 5 at 54.

Claim 4: nanotube mesh without filling the channel – see col 6 lines 45-54 wherein it teaches any size, shape and spacing.

Claims 5-7: more than one mesh – see figure 6. complete or partial fill of the nanotubes – see col 6 lines 45-54.

Claim 8 recites intended use. See abstract.

Claims 9-11 – functionalized/derivatized – see col 8 lines 33-47.

Claim 12: pore size, etc – col 5 lines 20-27.

Claims 13 - 16: etched as a groove, cover layer, anodically bonded ((conventional MEMS process) – fig 5 and 6, col 10 lines 47-67.

Claim 17: more than one channel – fig 6

Claim 45: Noca teaches the method as claimed – see abstract; and the structure of the microfluidic channel sieve is anticipated by Noca as shown in claim 1 supra..

Claim 46: Pressure driven flow is inherent in the device of Noca, even if Noca does not specifically teaches so. Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noca' 810.

Noca' 810 teaches all the limitations of claim 1. Instant claims add the further limitation of microfabricated “nubbins” (posts) positioned to prevent dislocation of the carbon nanotube mesh, which is not taught by the reference. However, since the reference teaches the carbon nanotube mesh (54) as integral with or embedded in the

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channels (68) (col 10 lines 47-67), such nubbins become redundant and unnecessary.

Omission of an Element and Its Function Is Obvious If the Function of the Element Is

Not Desired. *Ex parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) (Claims at

issue were directed to a method for inhibiting corrosion on metal surfaces using a

composition consisting of epoxy resin, petroleum sulfonate, and hydrocarbon diluent.

The claims were rejected over a primary reference which disclosed an anticorrosion

composition of epoxy resin, hydrocarbon diluent, and polybasic acid salts wherein said

salts were taught to be beneficial when employed in a freshwater environment, in view

of secondary references which clearly suggested the addition of petroleum sulfonate to

corrosion inhibiting compositions. The Board affirmed the rejection, holding that it would

have been obvious to omit the polybasic acid salts of the primary reference where the

function attributed to such salt is not desired or required, such as in compositions for

providing corrosion resistance in environments which do not encounter fresh water.).

See also *In re Larson*, 340 F.2d 965, 144 USPQ 347 (CCPA 1965) (Omission of

additional framework and axle which served to increase the cargo carrying capacity of

prior art mobile fluid carrying unit would have been obvious if this feature was not

desired.); and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975) (deleting a prior art

switch member and thereby eliminating its function was an obvious expedient).

3. Claims 1-19, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al (US 2004/0149209) in view of Noca' 810.

Claims 1,2 and 45: Dai teaches a carbon nanotube mesh comprising a plurality of intertwined free-standing carbon nanotubes (paragraph 4, examples 1 and 2) fixedly attached to a substrate which is useful for separating, concentrating or filtering molecules (paragraphs 44, 2). Dai also teaches the process as claimed in claim 45. However, Dai does not teach the specifics of the structure of the microfluidic channel for the device. Noca teaches the specific structure of the microfluidic channel for use in separation processes (figures 5 and 6, abstract, col 4 line 15 – col 5 line 37. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Noca in the teaching of Dai for the structural details that are missing from the Dai reference for making the device for its intended use.

Re Claims 3-19, Noca teaches all the structural details as follows:

Claim 3: channel filled with the mesh – see figure 5 at 54.

Claim 4: nanotube mesh without filling the channel – see col 6 lines 45-54 wherein it teaches any size, shape and spacing.

Claims 5-7: more than one mesh – see figure 6. complete or partial fill of the nanotubes – see col 6 lines 45-54.

Claim 8 recites intended use. See abstract.

Claims 9-11 – functionalized/derivatized – see col 8 lines 33-47.

Claim 12: pore size, etc – col 5 lines 20-27.

Claims 13 - 16: etched as a groove, cover layer, anodically bonded ((conventional MEMS process) – fig 5 and 6, col 10 lines 47-67.

Claim 17: more than one channel – fig 6

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Claims 18 and 19: The references do not teach the nubbins as claimed.

However, since Dai in view of Noca teach the carbon nanotube mesh (54) as integral with or embedded in the channels (68) (Noca: col 10 lines 47-67), such nubbins become redundant and unnecessary. Ex Parte Wu.

Claim 46: Pressure driven flow is inherent in the device of Dai in view of Noca, even if the references do not specifically teach so. Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Patent Examiner
4/11/05


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